

### Lectures on Bacteria.<sup>2</sup>

The multiplication of text books of bacteriology written from the standpoint of pure science rather than from that of medicine or technical industry is a hopeful sign. It means, let us trust, the ultimate correction of the asymmetrical development of the subject observable in the last few years, and may perhaps presage a certain reaction from the feverish search after all manner of "curative sera." In fact, continued advance along practical lines is possible only if the broader field is sedulously cultivated. The significance to agriculture, for example, of Winogradsky's work upon the nitrifying organism cannot perhaps be overestimated, but it is increasingly apparent that more research into the purely scientific aspects of nitrification must be forthcoming before we can hope to apply practically the results already obtained. The rescue of the subject of bacteriology from too exclusive devotion to test tube and guinea pig, and the return to the more wholesome if less sensational biological methods, will be forwarded by books like these "lectures" of Fischer.

The lectures contain a full disquisition upon the morphology and systematic position of bacteria, the structure of the cell being viewed, so to speak, from the standpoint of a plasmolysist. Bütschli's conception of the "central body" is, of course, stoutly opposed. Nearly one-third of the book is wisely given up to a description of the part played by bacteria in the transformation of nitrogen and carbon compounds; and the fundamental questions of putrefaction, nitrification, nitrogen-assimilation, fermentation, etc., are lucidly, if somewhat didactically, treated. Thirty pages (out of 160) are given to a consideration of bacteria in the rôle of excitants of disease, but in this brief space the author endeavors to set forth the true inwardness of serum therapy, devotes a word and a picture to the phagocyte theory, and has a paragraph even for the new tuberculin preparations "TO" and "TR!" A series of 164 notes at the end of the book, with references to pages of the text, contains some very useful bibliographical material, and serves to bring the lectures quite abreast of our knowledge. Fischer finds himself wholly unable to accept the remarkable observations of Stutzer and Hartleb<sup>3</sup> on the nitrifying organisms (note 72), and completely rejects the notion of extreme polymorphism advanced by these authors, whose investigations he characterizes as "full of gaps and entirely inadequate."—E. O. J.

### MINOR NOTICES.

IN MERCK'S Report for August 15 and September 1, Mr. Frederick LeRoy Sargent has a paper on the Rununculaceæ, giving a general account of the morphology of the family.—C. R. B.

<sup>2</sup> FISCHER, DR. ALFRED.—Vorlesungen über Bakterien. 8vo. pp. 186. Jena: Gustav Fischer, 1897. *M* 4.

<sup>3</sup> Centrabl. f. Bakt. 3<sup>2</sup>: 1897.



A REVISION of the North American Lemnaceæ has been published by Mr. Charles Henry Thompson.<sup>4</sup> It seems that this is the first revision of the North American species, and is based upon a study of the rich Engelmann collection, with Dr. Engelmann's notes and sketches, together with material from the most important collections of the country. The study of herbarium material was supplemented by an examination of abundant living material of nearly every species. The group is difficult on account of its polymorphism, showing two or three distinct phases. The vegetative and reproductive phases result in different looking plants, and the "resting phase," when it occurs, is different from both. Naturally these various phases have brought confusion into descriptions. Spirodela is represented by its single well known species, Lemna contains six, Wolffiella three, and Wolffia three, one of which is new. The contribution is a very valuable bringing together of material.—J. M. C.

A BRIEF ACCOUNT of the life and work of the late Fredrick Wilhelm Klatt is given in the *Bulletin l'Herbier Boissier*,<sup>5</sup> by Dr. Hans Schinz. He was born in Hamburg, February 13, 1825, and died March 3, 1897. He was best known to American botanists by his studies of the Compositae of the American tropics. The bibliography prepared by Dr. Schinz contains forty-nine titles, extending from 1856 to 1896.—J. M. C.

THE SERIES of papers upon "North American Coniferae," published by Dr. Edson S. Bastin and Mr. Henry Trimble in the *American Journal of Pharmacy*, from January 1896 to July 1897, have been brought together in a convenient pamphlet form.—J. M. C.

PARTS 155 to 158, and 161 to 163 of *Die Natürlichen Pflanzenfamilien* are supplements to the second, third, and fourth volumes. Much interesting new material is brought together, and many of the families are brought up to current knowledge. It is interesting to note that the recent discovery of spermatozoids in Cycas and Ginkgo (their discovery in Zamia being too recent to be included) has led to a modification of the characters assigned to gymnosperms, and has induced Dr. Engler to separate the genus Ginkgo from the conifers and make it the type of a distinct family, the Ginkgoaceæ, to which five or six fossil genera also belong. It is strange that this has not been done long ago, even before the spermatozoid discovery. The gymnosperms are further recast by recognizing six great groups ("classes" of Engler) instead of the usual four. We have been accustomed to cycads, cordaites, conifers, and gnetums; but the Engler classes now are Cycadales, Bennettitales, Cordiales, Ginkgoales, Coniferae, and Gnetales. The numerous further changes in the grouping of

<sup>4</sup> Separate from the ninth annual Report of the Missouri Botanical Garden, pp. 22, pl. 4. 1 N. 1897.

<sup>5</sup> 5: 836-839. 1897.



the gymnosperms cannot be noted; but it is with some regret that we abandon the famous name *Welwitschia mirabilis* for *Tumboa Bainesii*. An interesting addition is also made to the literature of the morphology of angiosperms in presenting and illustrating the results of Guignard's work on *Lilium Martagon*. Parts 159 and 160 contain Sphaeriales and Laboulbeniineæ by G. Lindau, and Hemibasidii (Ustilagineæ and Tilletiineæ) and Uredinales by P. Dietel.—J. M. C.

A RECENT CONTRIBUTION from the Gray Herbarium contains the results of Mr. Fernald's recent studies.<sup>6</sup> The first part presents a systematic study of the United States and Mexican species of *Pectis*. A full historical sketch of the various groupings of the species precedes the synoptical presentation. Thirty-eight species are recognized, and are grouped under five subgenera, *Eupectis*, *Pectidopsis*, *Pectothrix*, *Heteropectis*, and *Pectidium*. Six new species are described. The second part contains descriptions of rare and undescribed species collected by Dr. Edward Palmer at Acapulco, Mexico.—J. M. C.

TEACHER'S LEAFLETS, no. 8,<sup>7</sup> is intended to give teachers a knowledge of the minute points of difference in leaves and acorns of the white, bur, chestnut, swamp white, red, scarlet, and black oaks. It is written by Mr. A. P. Wyman and contains illustrations of the leaves and acorns of each kind described. These leaflets must be of great value to teachers who are expected to conduct nature study in primary schools.—C. R. B.

A BOOK of laboratory directions intended primarily to accompany Sedgwick and Wilson's *General Biology* has been prepared by Dr. Harriet Randolph<sup>8</sup> of Bryn Mawr College. This provides specific directions for laboratory work, occupying about six hours a week for the collegiate year. The forms treated are fern, earthworm, amoeba, white blood-corpuscle, lichen, mushroom, bacteria, spirogyra, hydra, mussel, lobster, moss, frog, fish, pigeon, and rabbit. There are also laboratory directions for the study of the stem, bud, leaf, and seed of plants and the circulation of protoplasm, and for the embryology of the frog and chick. The directions are well arranged but seem to us too brief and likely to induce superficiality, especially in view of the short time allotted to each organism. The fern (*Pteris*) cannot be studied properly in ten hours, the moss (*Polytrichum*) in five and *Penicillium*, a lichen and a mushroom in four, unless the students are vastly more expert than most beginners.—C. R. B.

<sup>6</sup>FERNALD, M. L.—Contributions from the Gray Herbarium of Harvard University. From Proc. Amer. Acad. 33: 57-94. 1897.

<sup>7</sup>Teachers Leaflets on nature study: prepared by the College of Agriculture, Cornell University. Address Chief Clerk, as above, Ithaca, N. Y.

<sup>8</sup>RANDOLPH, HARRIET.—Laboratory directions in general biology. 12 mo. pp. vi+163. New York: Henry Holt & Co. 1897. 80 cents.



THE PREVALENCE of tubercle bacilli in market butter has been made the subject of especial investigation of late by a number of workers. Groening<sup>9</sup> and Obermüller,<sup>10</sup> working independently, have found that a large percentage of samples of butter are able to produce in guinea pigs pathological lesions that were similar to tuberculosis. Smear preparations made from the diseased tissues showed the presence of bacilli that reacted toward stains in a manner similar to the tubercle organism. Groening found in eight out of seventeen cases, bacilli that he identified as tubercle bacilli, although in this determination he omitted to make cultures and critically study the isolated organism. Obermüller's results were even more startling, for in every sample examined (fourteen in number) tubercle bacilli were found.

Lydia Rabinowitsch<sup>11</sup> has recently made a thorough examination of a large number of samples (thirty in Berlin and fifty in Philadelphia) and her results throw grave doubts on the previous results mentioned. She finds in a considerable number of samples (28 per cent.) an organism able to produce in guinea pigs lesions which resemble, microscopically as well as macroscopically, the genuine tubercle bacillus so closely that the two can only be differentiated by the aid of cultures. Furthermore, in not a single case were tubercle bacilli found which agreed in all particulars with the type descriptions. The organism that so closely resembles the true tubercle germ is mildly pathogenic for guinea pigs but not for other animals. Culturally, and in its reaction toward tuberculin, it is readily distinguished from *Bacillus tuberculosis*.

These careful investigations render it extremely probable that the results of other investigators have been misinterpreted owing to the lack of more thorough study of the supposed tubercle organism.—H. L. RUSSELL.

THE PROCEEDINGS of the Indiana Academy of Science for 1896, just issued, bear evidence of a marked botanical activity in that state. Twelve papers upon botanical subjects are published in full, while nearly as many more appear by title only. As might be expected from the organization of a State Biological Survey by the Academy a few years ago, many of the papers are in the nature of contributions to the flora of the state. Those treating of the spermatophytic flora are Messrs. Stanley, Coulter, Hessler, Blatchley, and Chipman. The interesting fact concerning these papers is that they indicate in a marked degree the passing of the day of mere lists of names, and the beginning of local studies of plants in relation to their surroundings. The paper of Dr. Robert Hessler upon the "Flora of Lake Cicott and Lake Maxinkuckee," and that of Mr. W. W. Chipman upon the "Flora of the lake region of northeastern Indiana," in their presentation of the physiographic conditions of the areas studied, in their indications of

<sup>9</sup>Groening, Cent. f. Vet. Viehmarkt. u. Schlachthoflangeleg, 1897, nos. 14-15.

<sup>10</sup>Obermüller, Hyg. Rund. 1897, no. 14.

<sup>11</sup>Rabinowitsch, Zeit. f. Hyg. 26: 90. 1897.



physiographic changes consequent upon the reclamation of swamp lands, and in their notes upon the plant movements necessitated by these changes, bring together a mass of facts of extreme interest and value. Mr. Blatchley, under the title of some "Phanerogams new or rare to the state," records the stations and habitats of ninety-three species, of which thirty-three have not heretofore been recorded as occurring within the state, the remainder being recorded from a single station only. In "Contributions to the flora of Indiana, No. IV," Professor Stanley Coulter discusses "The Compositæ of the state with special reference to their distribution." Of the two hundred and thirteen specimens recorded, it is shown that thirty-six species are reported from a single station; that eight species are strictly northern, twenty-four southern, and one western in distribution within the state; and that the remaining one hundred and forty-four species are of general distribution. Preceding the discussion of the distribution of the species there is given a brief summary of certain experiments touching the germination of Compositæ and the power of resistance shown by seedlings to temperature and moisture changes. These experiments promise to yield results of exceptional importance, and are of more than passing interest.

Additions to the cryptogamic flora of the state are made by Dr. L. M. Underwood and Dr. J. C. Arthur. Miss Lilian Snyder contributes an article upon "The Uredineæ of Tippecanoe county," noting seventy species, fifteen of which have here their first record for the state.

In physiological botany Professor M. B. Thomas discusses "Periodicity of root pressure," arriving at the following general conclusions: the periodicity of root pressure seems to be inherent in the plant, and has either been acquired by previous adaptation to environment, or is the result of the action of some constant or periodic changes in the plant; root pressure does not seem to have any relation to the previous periodicities of the vital activities of the plant when the top was connected with the roots; the measure of the root pressure seems to be the osmotic activity of the root hairs, and is probably due to the presence of organic acids and other substances in the rhizoids that show great affinity for water; although the organic acids increase in the cells at 50°-60°F., their increase does not seem to make any appreciable difference in the periodicity, this being true even when the temperature of the soil is brought up to 55°F., approaching the time of minimum pressure.

Katherine E. Golden records a series of experiments undertaken to determine whether or not the common yeasts have pathogenic properties. Rabbits and guinea pigs were used in the work, the results indicating that yeasts when taken into the stomach of those animals cause neither discomfort, nor lesions in any organ, even when a fermentable substance be eaten at the same time. Injections from wort cultures of yeast were also made in the case of both animals, to note the effect of yeast when introduced into the circulation, but in no case could ill effects be observed. The results of the



experiments agree in the main with those of Neumayer except that he claims that an injury to an animal may always be expected if fermentable substances be taken at the same time as the yeasts.

Professor A. W. Bitting and Charles E. Davis, as the result of a study of "The bacteriological flora of the air in stables," give descriptions and illustrations of eighteen forms studied in detail.

"A revision of the species of the genus *Plantago* occurring within the United States," by Alida M. Cunningham, suggests an arrangement of species based upon seed characters, in the belief that such characters are most likely to be constant and of diagnostic value. According to Miss Cunningham, the genus may be broken up into three sections, clearly separated by seed characters as follows:

(1) Seeds oval in cross section (*P. cordata*, *Major*, *Rugelii*, *eriopoda*, *decipiens*, *maritima*, *Tweedyi*); (2) seeds more or less anther shaped in cross section (*P. lanceolata*, *Patagonica*, *hirtella*, *Virginica*, *rubra*, *minima*?); (3) seeds irregularly lobed in cross section (*P. elongata*, *heterophylla*, *Bigelovii*). Miss Cunningham considers that no good reason exists why vars. *aristata* and *gnaphalioides* of *P. Patagonica*, and var. *longifolio* of *P. Virginica* should be raised to specific rank, concluding from seed characters that they should still be considered as varieties. *P. decipiens*, however, she believes, should not be included under *P. maritima*, being clearly separable from that species. So far as examined, all forms labeled *P. major*, var. *Asiatica*, are referable to either *P. major* or *P. Rugelii*. Two new species, *P. rubra* and *P. minima*, are described; *P. rubra* being separated from *P. Virginica* by the dense hairs, acute sepals, shape and dehiscence of capsule, color, cross section and size of seeds; *P. minima* being closely allied to *P. Patagonica*, var. *gnaphalioides*, and separated from it by size, surface of sepals, size of capsule, color, size and surface of seed. The material examined by Miss Cunningham embraced the collections of the National Herbarium, the Herbarium of the University of Minnesota, the Herbarium of Professor John M. Coulter, and that of Purdue University. The work has been done with extreme care, and the analytic keys and figures accompanying the article add greatly to its value.

Miss Clara Cunningham, in a concisely written paper accompanied by two plates, gives the result of experimental studies concerning the "Effects of drought upon certain plants." The result of the experiments served to show that immature plants, subjected to drought even for a very short time, undergo decided changes, not merely in general appearance, but also in structural details.

The volume of proceedings itself is fairly good, so far as the letter press goes, but the proof reading is inexcusably careless in parts, while the plates in the main are admirable illustrations of how plates should not be printed. The work of the Academy is excellent, that of the state printer is not beyond reproach.